

## ABSTRACT

[0057] A digital nonlinear adaptive mechanism for frequency offset compensation for use in a digital Frequency Shift Keying (FSK) receiver such as a Bluetooth GFSK receiver. The mechanism is intended to aid in the recovery of a frequency-modulated signal in the presence of an unknown additive frequency offset, which could be greater than the peak frequency deviation and which must be suppressed to enable proper data recovery in the receiver. The mechanism utilizes a demodulator to convert the frequency offset into a digitally represented DC level. This level is extracted by a non-linear estimator based on peak detectors and filters. Active suppression of the DC level is achieved by feed-forwarding the estimated value into a subtractor that removes it from the digital signal. A gear shift mechanism incorporated within the DC estimation block enables the dynamic control of the DC estimation process. Charge and discharge coefficients are configured dynamically to provide fast frequency offset compensation during the reception of the redundant header at the beginning of a packet and relatively slow frequency offset compensation during the subsequent reception of the payload portion of the packet, thus minimizing both the acquisition time and the payload's BER in the receiver.